CHAPTER 6.0
CONSERVATION ACTIONS

We must protect the forests for our children,
grandchildren and children yet to be born.
We must protect the forests for those who can't speak for themselves
Such as the birds, animals, fish and trees.

Qwatsinas, Nuxault Nation

6.1 SYNTHESIS OF CONSERVATION STRATEGIES

In the previous chapter, we identified numerous threats, challenges, and needs affecting Maine's Species of Greatest Conservation Need (SGCN) (Tables 30-35) as well as a number of threats and potential threats to the 21 key habitats used throughout this document (Table 36), including threats that are common to more than one habitat type (e.g. climate change, pollution, development, contaminants, etc.), and threats that are unique to a particular habitat. Threats to the habitats were identified based on their potential effect on SGCN.

In this chapter and accompanying appendices, we identify hundreds of conservation actions that address those threats and needs, and we present a coarse filter/fine filter process to prevent further impacts to wildlife and to more effectively use available resources to conserve Maine's SGCN.

Tables 30-35 (Chapter 5) also include hundreds of potential conservation actions and opportunities, presented both at the ecosystem and species level for birds, herpetofauna, invertebrates, inland fish, mammals (non-marine), and diadromous fish.[1] Information used to populate Tables 30-35 came from a wide variety of sources. For conservation actions specific to SGCN species and their habitats, we consulted international, national, regional, and state plans and initiatives. We also consulted our knowledge base of conservation actions that was compiled through our comprehensive species planning and public involvement processes (Chapter 6.2.1). We also need to acknowledge that the species experts who compiled these tables, have, through years of experience and accumulated knowledge, become very familiar with the conservation needs of the species they work with. Finally, members of the CWCS Public Working Group were given the opportunity to critique these tables and provide further input, which several chose to do. For more detailed information on sources we consulted, please refer to the *Sources of Information* (Chapter 11) and the *Literature Cited and References* sections of this document.

[1] Habitat restoration strategies for the Gulf of Maine (GOMC 2004) are found in Appendix 5. Publications that describe conservation and management recommendations to reduce negative impacts to marine species of concern in Maine (McCollough et al. 2003, Stockwell 2004) and the Northeast region (NOAA 2004) are found in Appendix 15.

Conservation actions described in Tables 30-35 (Chapter 5) will serve as a solid foundation for the future of wildlife conservation and will help guide the collaborative efforts of state and federal agencies, tribes, conservation partners, and individuals to ensure success. However, Maine's CWCS is not a fixed set of conservation objectives and strategies. Rather, the CWCS is a series of processes (described later in this chapter) that can be used to identify Department and partner priorities from the individual species to the landscape level. It is a process that is dynamic, responsive, and adaptive.

Based on the hundreds of potential conservation actions and opportunities – addressing threats, challenges, and needs in Maine – we identified 5 broad program components, super strategies if you will, which along with representative, general conservation strategies are described in Table 37. Program components address 5 major categories of threats and needs synthesized from the numerous ones identified in Tables 30-35. These include:

1. **Surveys and Monitoring** – Addresses data gaps and informational needs on the distribution, abundance, and status of SGCN;

2. **Research** – Addresses gaps in our understanding of life history, productivity, mortality, habitat requirements, limiting factors, interactions with other species, and conservation needs of priority species;

3. **Population Management** – Addresses acute population threats (e.g., take, excessive mortality);

4. **Habitat Conservation**[2] – Addresses threats to SGCN habitat due to alteration and degradation, conversion, fragmentation, introduction of invasives and exotics, pollution, etc.; and

5. **Education and Outreach** – Addresses the public's lack of understanding of the needs and requirements of SGCN, and the need to raise the public's awareness of the threats to SGCN and their habitats.

Inherent within each program component is a level of program supervision, coordination, and administration (planning, goal setting, evaluation, monitoring, and budgeting) necessary to ensure completion of conservation actions.

A relational database will be developed later in 2005 to help identify opportunities for conservation actions that will benefit the most SGCN and their habitats and bring the "biggest bang for the buck." The database will also facilitate analyses and monitoring of SGCN and their habitats, allow us to identify common threats and conservation actions, serve as a communication tool within the Maine Departments of Inland Fisheries and Wildlife (MDIFW) and Marine Resources (MDMR) and the Maine Atlantic Salmon Commission (MASC), and become the centralized place to store data used to drive conservation actions. We will also look for opportunities to link with other databases, both within and outside MDIFW, MDMR, and MASC, that serve as archives for project evaluations, planning resources, and reporting project activities.

[2] Habitat-specific actions presented in Tables 30-35 are described when habitat could be a limiting factor for a species. General habitat protection is provided through landscape level habitat conservation (Section 6.2.2).

In the interim, in order to assess priorities across taxa and key habitats, MDIFW and MDMR staff, in consultation with species experts and stakeholders, identified the two highest priority conservation super strategies for each SGCN within the primary habitat in which they occur. (Tables 38 and 39). This level of organization is not meant to supersede the conservation actions identified for individual species or habitats (Tables 30-35, Chapter 5). Rather, it is a broader-scale approach to synthesizing needs that will address the most species and threats and yield the highest conservation return.

Table 37. General conservation strategies for Maine's CWCS organized within 5 program components. Species-specific strategies are presented in Chapter 5, Tables 30-35. Strategies are provided as examples, do not constitute an exhaustive list, and are not presented in order of priority.

Program Components	General Conservation Strategy
Surveys & Monitoring	Conduct systematic, statewide surveys to document distribution and abundance of SGCN in the ecoregions of Maine.
	Compile and map element occurrence data for SGCN.
	Assess population size, viability, and habitat extent for priority species at known occurrence(s).
	Monitor SGCN to determine population size, status, and trends. Coordinate monitoring objectives and methods with regional partners.
	Investigate reports of SGCN occurrence to determine validity.
Research	Conduct applied research to investigate life history, productivity, mortality, habitat requirements, limiting factors, interactions with other species, and conservation needs of priority species.
	Combine field survey and applied research to identify specific characteristics of habitats important to priority species.
	Investigate existing and potential threats to determine population level effects on priority species.
	Coordinate research objectives with state and regional partners.
Population Management	Consider intensive population management as a means of enhancing survival and/or recruitment of priority species.
	Work with state and national partners to implement pilot projects addressing population enhancement at select focus areas.
	Consider site-specific, intensive population management and recovery measures for rare species threatened by imminent extirpation.
	Implement and enforce environmental rules and laws that affect survival of priority species.
	Actively deter, reduce, or eliminate predators impacting populations of priority species.
	Develop effective mitigation and relocation protocols for projects displacing priority species and conduct longterm post-monitoring of impacted populations to determine efficacy of mitigation and relocation techniques.

Table 37. General conservation strategies for Maine's CWCS organized within 5 program components. Species-specific strategies are presented in Chapter 5, Tables 30-35. Strategies are provided as examples, do not constitute an exhaustive list, and are not presented in order of priority.

Program Components	General Conservation Strategy
Population Management (continued)	Promulgate and evaluate hunting and fishing regulations that control harvest and sustain populations.
	Develop and implement rehabilitation programs for priority sport fisheries that have declined.
Habitat Conservation	Implement landscape level habitat conservation initiatives.
	Develop regulatory habitat protection provisions for projects under the Maine Endangered Species Act (MESA) and other regulations protecting Maine's wildlife [e.g. Natural Resources Protection Act (NRPA), Site Location Law].
	Develop consistent regulatory habitat protection standards for projects subject to review under the MESA and NRPA.
	Support enforcement of existing environmental laws to protect key habitats.
	Develop nonregulatory habitat management guidelines for priority habitats and species for distribution to landowners, land managers towns, landtrusts, and others.
	Cooperate with TNC, NRCS, landowners, local landtrusts, municipalities, and other partners to conserve habitat for priority species using fee acquisition, conservation easements, purchase of development rights, incentives, cooperative management agreements, management plans, improved comprehensive planning, habitat restoration and enhancements, and other conservation tools.
	Identify existing and potential threats to habitats for priority species and consider restorative measures to improve habitat integrity.
	Develop and monitor the implementation of specific conservation actions.
Education and Outreach	Increase public awareness of threats and concerns of priority species using print, media, website, etc.
	Implement existing and new public outreach efforts to promote an understanding and awareness of, and gain support for priority species and their habitats.
	Support and assist in implementing surveys to assess attitudes and knowledge of specific wildlife resources in Maine's CWCS.

Table 38. Two Highest Program Components (Super Strategies) Needed by Maine's SGCN.
(Sorted by primary habitat in which each SGCN occurs[1])

Habitat / Species	Surveys / Monitoring	Research	Population Management	Habitat Conservation[2]	Education & Outreach
Coastal					
Marine Open Waters (CO)					
American Shad	X			X	
Atlantic Ridley	X				X
Atlantic Salmon	X	X			
Atlantic Sturgeon	X			X	
Finback Whale	X				X
Greater Shearwater	X	X			
Humpback Whale	X				X
Leatherback	X				X
Loggerhead	X				X
Northern Right Whale	X				X
Red-necked Phalarope	X	X			
Sei Whale	X				X
Sperm Whale	X				X
Striped Bass	X	X			
Estuaries and Bays (CE)					
American Black Duck (Wintering Population)			X	X	
Common Eider (Molting and Wintering Birds)		X	X		
Common Loon (Wintering and Non-breeding)			X		X
Greater Scaup (Non-breeding)	X		X		
Ruddy Duck	X		X		
Shortnose Sturgeon	X			X	
Rocky Coastline and Islands (CC)					
American Oystercatcher	X			X	
Arctic Tern	X		X		
Atlantic Puffin	X		X		
Bald Eagle	X			X	
Cattle Egret	X		X		
Common Eider (Breeding Population Only)	X	X			
Common Murre	X		X		
Common Tern	X		X		
Glossy Ibis	X		X		
Great Cormorant	X		X		
Great Egret	X		X		
Harlequin Duck	X				X
Little Blue Heron	X		X		
Penobscot Meadow Vole	X	X			
Purple Sandpiper	X	X			
Razorbill	X		X		
Roseate Tern	X		X		
Ruddy Turnstone	X			X	
Snowy Egret	X		X		

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(Sorted by primary habitat in which each SGCN occurs[1])

Habitat / Species	Surveys / Monitoring	Research	Population Management	Habitat Conservation[2]	Education & Outreach
Tri-colored Heron	X		X		
Unconsolidated Shore (CU)					
Great Blue Heron	X			X	
Greater Yellowlegs	X			X	
Least Tern			X	X	
Piping Plover			X	X	
Red Knot	X			X	
Sanderling	X			X	
Semipalmated Sandpiper	X			X	
Whimbrel	X			X	
Estuarine Emergent Salt Marsh (CS)					
Black-crowned Night Heron	X		X		
Citrine Forktail *Ischnura hastata*	X				X
Nelson's Sharp-tailed Sparrow	X	X			
Saltmarsh Sharp-tailed Sparrow	X	X			
Willet	X			X	
Freshwater					
Lakes and Ponds (WL)					
American Eel	X	X			
Arctic Charr			X	X	
Barn Swallow			X	X	
Big Bluet *Enallagma durum*	X			X	
Bigmouth Pondsnail *Stagnicola mighelsi*	X				X
Bonaparte's Gull (Breeding)	X				
Brook Trout	X	X			
Burbot (Cusk)	X	X			
Common Loon (Breeding)			X	X	
Dusky Dancer *Argia translata*	X				X
Great Lakes Physa *Physella magnalacustris*	X				X
Lake Trout (Togue)			X	X	
Lake Whitefish		X		X	
Landlocked Salmon			X	X	
Longnose Sucker	X	X			
A Mayfly *Siphlonurus demaryi*	X				X
A Mayfly *Siphlonurus securifer*	X				X
Pied-billed Grebe	X	X			
Rainbow Smelt		X	X		
Rambur's Forktail *Ischnura ramburii*	X				X
Round Whitefish	X	X			

Table 38. Two Highest Program Components (Super Strategies) Needed by Maine's SGCN.
(Sorted by primary habitat in which each SGCN occurs[1])

Habitat / Species	Surveys / Monitoring	Research	Population Management	Habitat Conservation[2]	Education & Outreach
Scarlet Bluet *Enallagma pictum*	X	X			
Spatterdock Darner *Rhionaeschna mutata*	X		X		
Swamp Darter		X		X	
Tidewater Mucket *Leptodea ochracea*		X	X		
Tule Bluet *Enallagma carunculatum*	X				X
Emergent Marsh and Wet Meadows (WM)					
American Bittern	X	X			
American Black Duck (Breeding Population)			X	X	
American Coot	X	X			
Black Tern	X			X	
Common Moorhen	X	X			
Least Bittern	X	X			
Marsh Wren	X	X			
Purple Martin	X		X		
Sandhill Crane	X				
Sedge Darner *Aeshna juncea*	X				X
Sedge Wren	X	X			
Yellow Rail	X				
Forested Wetland (WF)					
Hessel's Hairstreak *Callophrys hesseli*			X	X	
Precious Underwing *Catocala p. pretiosa*	X				X
Swamp Darner *Epiaeschna heros*	X				X
Shrub-scrub Wetlands (WS)					
Blanding's Turtle		X		X	
Blue-spotted Salamander		X			X
Ringed Boghaunter *Williamsonia lintneri*	X			X	
Rusty Blackbird	X	X			
Spotted Turtle	X			X	
Willow Flycatcher	X	X			
Peatlands (WP)					
Canada Whiteface *Leucorrhinia patricia*	X				X
Clayton's Copper *Lycaena dorcas claytoni*			X	X	
Crowberry Blue *Plebejuis idas empetri*				X	X
Deep-Throat Vertigo *Vertigo nylanderi*	X				X

Table 38. Two Highest Program Components (Super Strategies) Needed by Maine's SGCN.
(Sorted by primary habitat in which each SGCN occurs[1])

Habitat / Species	Surveys / Monitoring	Research	Population Management	Habitat Conservation[2]	Education & Outreach
Frigga Fritillary *Boloria frigga*	X			X	
Pleistocene Catinella *Catinella exile*	X				X
Quebec Emerald *Somatochlora brevicincta*	X				X
Six-whorl Vertigo *Vertigo morsei*	X				X
Rivers and Streams (WR)					
American Eel	X	X			
American Shad	X			X	
Arrow Clubtail *Stylurus spiniceps*	X			X	
Arrowhead Spiketail *Cordulegaster obliqua*	X				X
Atlantic Salmon	X	X			
Atlantic Sturgeon	X			X	
Barrow's Goldeneye		X	X		
Boreal Snaketail *Ophiogomphus colubrinus*	X				X
Brook Floater *Alasmidonta varicosa*			X	X	
A Caddisfly *Hydroptila tomah*	X				X
Cobra Clubtail *Gomphus vastus*	X			X	
Louisiana Waterthrush	X			X	
A Mayfly *Baetisca rubescens*	X				X
A Mayfly *Nixe horrida*	X				X
A Mayfly *Nixe rusticalis*	X				X
A Mayfly *Plauditus veteris*	X				X
A Mayfly *Procloeon mendax*	X				X
A Mayfly *Procloeon ozburni*	X				X
A Mayfly *Procloeon simplex*	X				X
Pygmy Snaketail *Ophiogomphus howei*	X			X	
Rapids Clubtail *Gomphus quadricolor*	X			X	
Redfin Pickerel		X		X	
Roaring Brook Mayfly *Epeorus frisoni*	X				X
Shortnose Sturgeon	X			X	

Table 38. Two Highest Program Components (Super Strategies) Needed by Maine's SGCN.
(Sorted by primary habitat in which each SGCN occurs[1])

Habitat / Species	Surveys / Monitoring	Research	Population Management	Habitat Conservation[2]	Education & Outreach
Southern Pygmy Clubtail *Lanthus vernalis*	X				X
A Spire Snail *Amnicola decisus*	X				X
A Stonefly *Neoperla mainensis*	X				X
Striped Bass	X	X			
Tomah Mayfly *Siphlonisca aerodromia*	X			X	
Wood Turtle				X	X
Yellow Lampmussel *Lampsilis cariosa*		X	X		
Yellow-throated Vireo	X	X			
UPLAND					
Deciduous and Mixed Forest (UD)					
American Burying Beetle *Nicrophorus americanus*	X				X
Baltimore Oriole		X		X	
Black and White Warbler		X		X	
Black-billed Cuckoo		X		X	
Black-throated Blue Warbler		X		X	
Black-throated Green Warbler		X		X	
Canada Warbler		X		X	
Early Hairstreak *Erora laeta*	X				X
Eastern Box Turtle	X				X
Eastern Screech Owl	X	X			
Great-crested Flycatcher		X		X	
Lamellate Supercoil *Paravitrea lamellidens*	X				X
Mystery Vertigo *Vertigo paradoxa*	X				X
Northern Flicker		X		X	
Northern Parula		X		X	
Rose-breasted Grosbeak		X		X	
Scarlet Tanager		X		X	
Spicebush Swallowtail *Papilio troilus*	X				X
Veery		X		X	
Wood Thrush		X		X	
Yellow-bellied Sapsucker		X		X	
Coniferous Forest (UC)					
American Three-toed Woodpecker	X	X			
Barred Owl		X	X		
Bay-breasted Warbler		X		X	
Blackburnian Warbler		X		X	
Cape May Warbler		X		X	

Table 38. Two Highest Program Components (Super Strategies) Needed by Maine's SGCN.
(Sorted by primary habitat in which each SGCN occurs[1])

Habitat / Species	Surveys / Monitoring	Research	Population Management	Habitat Conservation[2]	Education & Outreach
Long-eared Owl	X	X			
Olive-sided Flycatcher	X	X			
Pine Devil *Citheronia sepulcralis*	X				X
Purple Finch		X		X	
Purple Lesser Fritillary *Boloria chariclea grandis*	X			X	
Red Crossbill		X		X	
Dry Woodland and Barrens (UB)					
Barrens Itame *Itame sp. 1*	X			X	
The Buckmoth *Hemileuca m. maia*	X			X	
Edward's Hairstreak Satyrium edwardsii	X			X	
Graceful Clearwing *Hemaris gracilis*	X				X
A Moth *Cucullia speyeri*	X			X	
A Moth *Nepytia pellucidaria*	X				X
A Noctuid Moth *Chaetaglaea cerata*	X			X	
Northern Black Racer	X	X			
Pine Barrens Zale *Zale sp. 1 nr. lunifera*	X			X	
Pine Barrens Zanclognatha *Zanclognatha martha*	X			X	
Pine Pinion *Lithophane l. lepida*	X				X
Pink Sallow *Psectraglaea carnosa*	X			X	
Prairie Warbler		X		X	
Sleepy Duskywing *Erynnis brizo*	X				X
Twilight Moth *Lycia rachelae*	X			X	
Upland Sandpiper		X		X	
Vesper Sparrow		X		X	
Mountaintop Forest (UM)					
Bicknell's Thrush	X			X	
Northern Bog Lemming	X	X			
Alpine (UA)					
American Pipit (Breeding)	X			X	
Katahdin Arctic *Oeneis polixenes katahdin*	X		X		
Shrub / Early Successional (US)					

Table 38. Two Highest Program Components (Super Strategies) Needed by Maine's SGCN.
(Sorted by primary habitat in which each SGCN occurs[1])

Habitat / Species	Surveys / Monitoring	Research	Population Management	Habitat Conservation[2]	Education & Outreach
American Woodcock	X			X	
Blue-gray Gnatcatcher	X	X			
Blue-winged Warbler	X	X			
Brown Thrasher		X		X	
Canada Lynx		X			X
Chestnut-sided Warbler		X		X	
Common Nighthawk		X		X	
Eastern Kingbird		X		X	
Eastern Towhee		X		X	
Loggerhead Shrike	X				
New England Cottontail			X	X	
Whip-poor-will	X	X			
Wolf	X				X
Grassland / Agriculture / Old Fields (UG)					
Bobolink		X		X	
Cobweb Skipper *Hesperia metea*	X			X	
Coral Hairstreak *Satyrium titus*	X			X	
Eastern Meadowlark		X		X	
Field Sparrow		X		X	
Grasshopper Sparrow	X			X	
Greenish Blue *Plebejus saepiolus amica*	X				X
Horned Lark (Breeding)	X	X			
Juniper Hairstreak *Callophrys gryneus*	X			X	
Leonard's Skipper *Hesperia leonardus*	X			X	
Short-eared Owl	X			X	
Urban/Suburban (UU)					
Chimney Swift		X		X	
Cliff Face and Rocky Outcrop (UR)					
Eastern Small-footed Myotis	X	X			
Golden Eagle	X			X	
Peregrine Falcon			X	X	
Timber Rattlesnake	X				X
Caves and Mines (UCM)[3]					

[1] We included diadromous species in each of the primary habitats in which they occur, but for summary purpose, counted them once.
[2] We assume that all species need and will benefit from landscape level habitat conservation as a high priority. Habitat Conservation in this instance refers to species-specific habitat conservation actions when habitat could be a limiting factor for a species.
[3] Not a primary habitat for any SGCN.

Based on input from species experts and stakeholders, it is apparent all five conservation program components (super strategies) are important and needed if Maine's CWCS is to be viable (Table 39). By far the greatest need is for surveys and monitoring, which is a reflection of our limited knowledge of the population status, trends, and distribution of many SGCN species. The second greatest need is habitat conservation, which includes landscape level and specific habitat conservation. The need for research was third. A lack of knowledge of the basic biology of many SGCN species hampers our ability to develop meaningful species assessments and management systems, and ultimately to implement effective population and habitat conservation programs for these species. The need for population management was identified for the fewest SGCN species, because population management is driven by species management systems, and less than half of the SGCN species are currently covered by a management system.

Table 39. Number of SGCN within Priority Program Components (Super Strategies). [1]

SGCN Taxon	Number of SGCN				
	Surveys and Monitoring	**Research**	**Population Management**	**Habitat Conservation**	**Education and Outreach**
Birds	64	58	28	56	2
Herpetofauna	4	3	0	3	4
Inland Fish	5	9	4	6	0
Invertebrates	66	3	7	26	42
Mammals	4	4	1	1	2
Marine	13	2	0	3	8
Total SGCN	**156**	**79**	**40**	**95**	**58**

[1] In order to assess priorities across taxa, MDIFW and MDMR staff, in consultation with species experts and stakeholders, identified the two highest priority conservation super strategies for each SGCN by habitat. This table summarizes the detailed taxa information presented in Table 38.

6.2 PROCESS FOR CONSERVING MAINE'S SGCN

Historically, wildlife conservation efforts have tended to focus on single species. Other conservation efforts identify and protect areas of land (focus areas) that contain diverse assemblages of at-risk wildlife species. However, as we continue to change our landscape, species-by-species and focus-area conservation approaches, while both laudable, may not be the most effective means to conserve biodiversity, and they do little to ensure the continued well-being of more common species also under Department stewardship. Landscape-level conservation that addresses the needs of many species by conserving the underlying resources upon which they depend, may be a more productive way to use limited resources to benefit the greatest number of species and address the full array of wildlife in Maine.

To prevent further impacts to wildlife, and to more effectively use available conservation resources, Maine has developed a process designed to conserve SGCN on a landscape scale. This landscape approach benefits many species, but it also allows for species-specific actions needed to ensure the well-being of species with specific needs not necessarily met by more

generalized strategies (Figure 17). Maine's coarse filter/fine filter approach for conserving SGCN builds on a species planning effort ongoing in the state since 1968; a series of ecoregional surveys of rare, Threatened, and Endangered animal and plant communities in progress since the late 1990s; a landscape approach to habitat conservation - *Beginning with Habitat* - initiated in 2000; and a long history of public involvement and collaboration among conservation partners. This process addresses both tenets of the State Wildlife Grant Program: it benefits Species of Greatest Conservation Need while keeping common species common.

The first step in the process to conserve Maine's SGCN asks the question "Do we have adequate knowledge to develop conservation actions meant to benefit a single species or group of species?" (Box 1 of Figure 17). If adequate knowledge concerning the biology, habitat requirements, distribution, and population status for a species or species group exists, the species is taken through MDIFW's comprehensive species planning process. This species focus approach is depicted in Boxes 2-10 and 14 of Figure 17 and is described in detail below (Section 6.2.1) and further referenced in Appendix 11.

If adequate knowledge does not exist to develop species-specific conservation actions, the right side of Figure 17 allows for opportunities to conduct surveys and monitoring (Box 11 of Figure 17); research to obtain information necessary to take a species or species group through MDIFW's comprehensive species planning process (Box 12 of Figure 17); education and outreach efforts to address the public's lack of understanding of the needs and requirements of SGCN, and the need to raise the public's awareness of the threats to SGCN and their habitats (Box 13 of Figure 17); while at the same time conserving species and their habitats with landscape level conservation actions - *Beginning with Habitat* - meant to benefit a large number of species both vulnerable and common (Box 14 of Figure 17). *Beginning with Habitat* embodies a fundamental change in the way that state and federal agencies in Maine approach wildlife habitat conservation. It is a habitat-based model that provides the information to cooperatively create a landscape with local decision-makers that will secure Maine's outdoor legacy. The *Beginning with Habitat* model is described in greater detail in Section 6.2.2 and in Appendix 12.

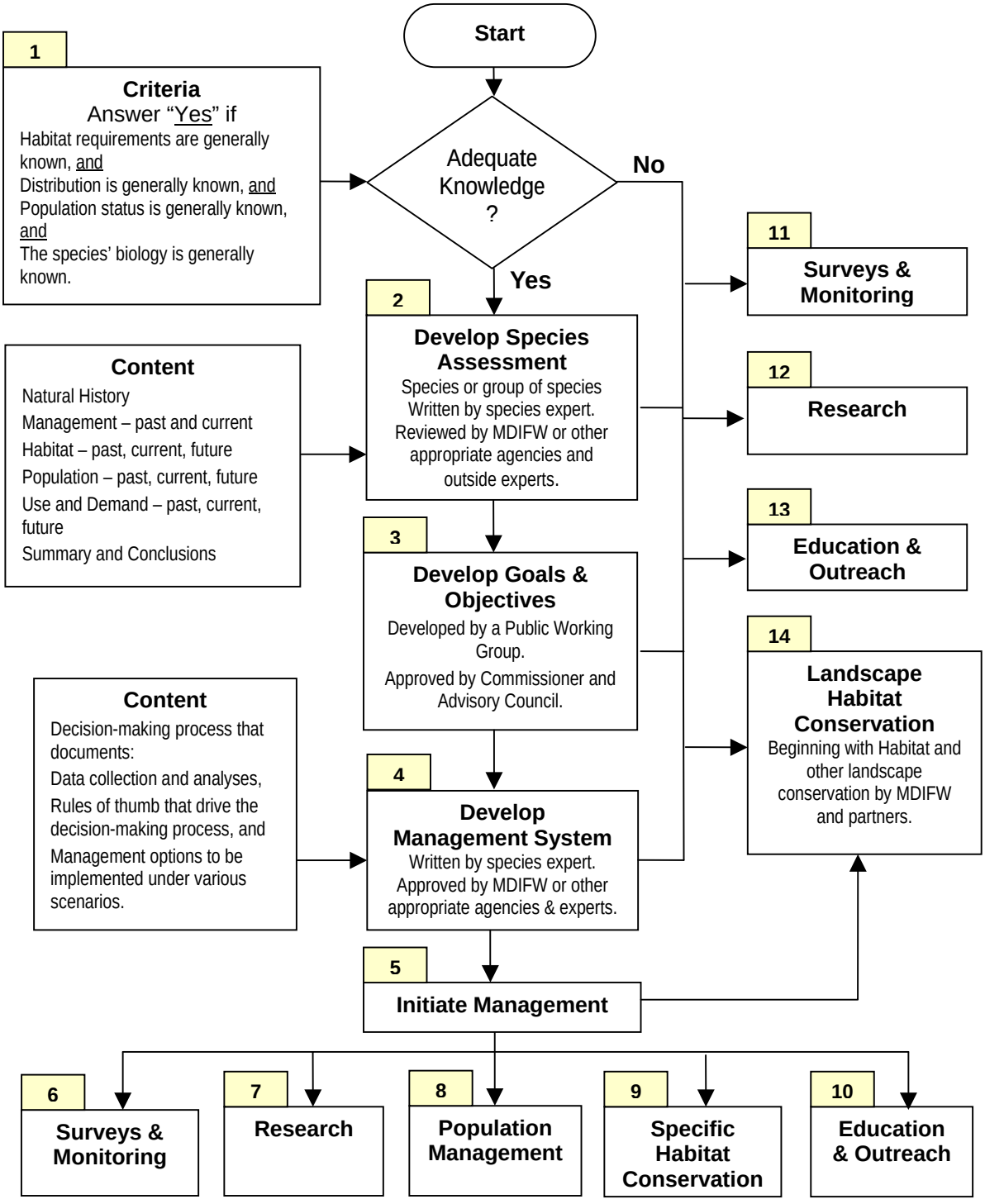
6.2.1 COMPREHENSIVE SPECIES PLANNING

Comprehensive planning was initiated in the Department of Inland Fisheries and Wildlife in 1968 and has been refined and expanded with each update. The initial plan (1975-1980) was a monumental task completed by following the steps of the model planning process (Anderson and Hurley 1980). However, the planning process is dynamic, and subsequent updates have combined steps of the planning process and employed new procedures.

Species plans were developed for 1975-1980, 1980-1985, 1986-1991, 1991-1996, and 2001-2006. In 1978-1979 and again in 1985-1986, each plan was completely updated (e.g. Species Assessments, Strategic Plans and supportive documentation, and Operational Plans) in compliance with the development of 5-year plans and the 3-year review and update required by Federal Aid during this period.

In 1989, MDIFW requested and received Federal Aid approval to modify the process. The request was based on the Department's commitment to use a full-blown public participation process to develop management goals and objectives for each species, or group of species, and implementation of a newly developed management system approach to document how the

Figure 17. Maine's Process for Conserving Species of Greatest Conservation Need.



NOTE: The above outlines how Maine will conserve SGCN species. However, a time may come when emergency population management and habitat conservation measures may be needed for a species that has not been through the planning process. These emergencies will be addressed as they arise.

Department would meet those goals and objectives. As a result, comprehensive species assessments, supporting inventory documentation, and strategic plans based on 15-year projections were recognized and accepted as the supporting documentation for the Application for Federal Assistance for a maximum of 15 years.

For most species, MDIFW prepares detailed strategic plans for 15-year periods with an abbreviated update at 5-year intervals. This process is followed whenever new species plans are prepared, the data upon which an existing plan is based are outdated, or the goals and objectives are no longer appropriate. However, for species plans receiving a routine update, an abbreviated update is completed. The abbreviated update addresses progress toward the goals and objectives, revisions of key tables in the assessment, a statement of goals and objectives for the next planning period, functioning of the management system, and when or upon what conditions the next full update will be completed.

Eventually, the Department intends to develop species assessments and management systems for more than all of its game, Threatened, and Endangered wildlife, as well as SGCN and other species of special management concern. Progress toward this goal has been directly related to the resources available to accomplish the tasks.

Since 1985, the Department has prepared 61 species assessments, including 54 individual species assessments and 7 assessments for groups of species. In total, the assessments encompass 279 species, 90 of these are SGCN. Also, 30 assessments have received major updates at least once since 1986 (Table 40). The Passerine Assessment is provided as a representative example of a species assessment (Appendix11).

Table 40. Summary of Species Assessments and Goals and Objectives 1986-2005.

Species	Number of Species	Number of SGCN	Year Prepared	G&O	Update	G&O
Birds						
American Woodcock	1	1	1986	1986	2001	2004
Atlantic Puffin/Razorbill	2	2	1999	2001		
Bald Eagle	1	1	1986	1986	2004	2004
Barrow's Goldeneye	1	1	2002			
Common Eider	1	1	2001	2001		
Golden Eagle	1	1	2000	2004		
Grasshopper Sparrow	1	1	1992	1992		
Harlequin Duck	1	1	2000	2001		
Island Nesting Seabirds	6	1	1993	1993		
Island Nesting Terns	3	3	1990	1992	2005	
Leach's Storm Petrel	1	0	1999	2001		
Least Tern	1	1	1993	2001		
Migratory Shorebirds	34	9	1994		2000	2001
Passerines	114	40	1998	2001		
Peregrine Falcon	1	1	1986	1986	1991	1992
Piping Plover	1	1	2000	2001		
Red-necked Phalarope	1	1	1997	2001		
Ruffed Grouse	1	0	1986	1986	2001	2004
Upland Sandpiper	1	1	2000			
Waterfowl	34	3	1986	1986	2005	
Wild Turkey	1	0	1986	1986	2000	2001

Table 40. Summary of Species Assessments and Goals and Objectives 1986-2005.						
Species	**Number of Species**	**Number of SGCN**	**Year Prepared**	**G&O**	**Update**	**G&O**
Herpetofauna						
Blanding's Turtle	1	1	1991	1992		
Eastern Box Turtle	1	1	2000			
Northern Black Racer	1	1	2000			
Spotted Turtle	1	1	1991	1992		
Vernal Pools	4	1	1999			
Inland Fish						
Arctic Charr	1	1	1986	1986	2001	2001
Brook Trout	1	1	1986	1986	2001	2001
Brown Trout	1	0	1986	1986	2001	2001
Burbot (Cusk)	1	1	1986	1986	2001	2001
Chain Pickerel	1	0	1986	1986	2001	2001
Lake Trout	1	1	1986	1986	2001	2001
Lake Whitefish	1	1	1986	1986	2001	2001
Landlocked Salmon	1	1	1986	1986	2001	2001
Largemouth Bass	1	0	1986	1986	2001	2001
Minor Sportfish	24	4	1986	1986	2001	2001
Muskellunge	1	0	1986	1986	2001	2001
Nonsport & Commercial Fish	6	0	1986	1986	2001	2001
Northern Pike	1	0	1986	1986	2001	2001
Rainbow Smelt	1	1	1986	1986	2001	2001
Rainbow Trout	1	0	1986	1986	2001	2001
Round Whitefish	1	1	1986	1986	2001	2001
Smallmouth Bass	1	0	1986	1986	2001	2001
White Perch	1	0	1986	1986	2001	2001
Invertebrates						
Clayton's Copper	1	1	2001	2001		
Tomah Mayfly	1	1	2001	2001		
Mammals						
Beaver	1	0	1986	1986		
Black Bear	1	0	1986	1986	2000	2001
Bobcat	1	0	1986	1986		
Eastern Coyote	1	0	1986	1986	1999	2001
Fisher	1	0	1986	1986		
Marten	1	0	1986	1986		
Mink	1	0	1986	1986		
Moose	1	0	1986	1986	1999	2001
Muskrat	1	0	1986	1986		
New England Cottontail	1	1	2004			
Raccoon	1	0	1986	1986		
Red Fox	1	0	1986	1986		
River Otter	1	0	1986	1986		
Snowshoe Hare	1	0	1986	1986	2000	2004
White-tailed Deer	1	0	1986	1986	1999	2001
Total	**279**	**90**				

The comprehensive species planning process currently being used in Maine involves 2 major parts, each with 2 steps. Part 1 includes compiling species assessments, which serve as the basis for the rest of the planning process, and developing publicly derived species management goals and objectives. Part 2 includes producing species management systems and developing jobs for the Department's operational plan to implement each management system. A representative example of the entire species planning process completed for 114 Passerines (40 of which are SGCN) is in Appendix 11.

Part 1. Step 1. Species Assessment

The purpose of a species assessment is to develop informed stakeholders and to establish common ground. A species assessment is a state-of-the-resource document written about individual species or groups of species. Species specialists within MDIFW are responsible for compiling these documents, and they are written for the public. Each assessment follows a standard outline, which includes:

I. INTRODUCTION - Standard introduction that reviews the species planning process and the role and purpose of the species assessment.

II. NATURAL HISTORY - Biological information about the species that would help the reader understand the uniqueness of the species and its role in the ecosystem.

III. MANAGEMENT

A. Regulatory Authority - Progression of the Department's regulatory authority as it relates to management of the species, including a historical and current perspective.

B. Past Goals and Objectives - Past management goals and objectives as established during previous planning segments.

C. Past Management - Historical overview of past management practices up to current management practices.

D. Current Management - Current species management

IV. HABITAT ASSESSMENT

A. Past Habitat - Historical habitat trends for the species including trends in carrying capacity (K), if known, at the Wildlife Management District (WMD) and/or statewide level.

B. Current Habitat - Current status of habitat and carrying capacity (K) for the species at the WMD and/or statewide level.

C. Habitat Projection - Expected habitat availability and carrying capacity 5, 10, or 15 years from now at the WMD and/or statewide level.

V. POPULATION ASSESSMENT

A. Past Populations - Past population(s) and relationships to carrying capacity (K) at the WMD and/or statewide level.

B. Current Populations - Current population status and its relationship to carrying capacity (K) at the WMD and/or statewide level.

C. Population Projections – What the population is expected to be 5, 10, or 15 years from now under current management and its expected relationship to carrying capacity (K), at the WMD and/or statewide level.

D. Limiting Factors - Factors that can lead to a functional carrying capacity that is lower than habitat carrying capacity (K) (e.g. human disturbance, intolerance, predation, etc.).

V. USE AND DEMAND ASSESSMENT

A. Past Use and Demand - Past consumptive and non-consumptive use of, and demand for, the species (up to current use and demand).

B. Current Use and Demand - Current consumptive and non-consumptive use of, and demand for, the species.

C. Use and Demand Projections - Projected use and demand for the species 5, 10, or 15 years from now.

V. SUMMARY AND CONCLUSIONS – Salient features of the assessment and major gaps in our knowledge of the species.

VI. LITERATURE CITED

MDIFW staff, and species experts from outside the agency, review the species assessment for completeness and accuracy before it is considered ready for the next step in the process.

Part 1. Step 2. Public Participation (Developing Management Goals and Objectives)

Involvement of the public in developing management goals and objectives for wildlife species was initiated during the 1986-1991 comprehensive plan update (MDIFW 1986). For the first time, biologists had to consider the concerns of the public, rather than try to sell their own values and attitudes. And, for the first time, public working groups developed management goals and objectives, rather than MDIFW employees developing them for steering committee concurrence.

After MDIFW prepares and reviews a species assessment, it convenes a public working group to develop species management goals and objectives. The composition of working groups is structured to ensure representation of a variety of interests as well as a geographical mix. Representatives from other state and federal agencies, various sportsmen groups [e.g. Sportsman's Alliance of Maine (SAM), Trout Unlimited (TU), Maine Trappers Association (MTA), Maine Professional Guide's Association (MPGA), etc.], wildlife conservation groups [e.g. Maine Audubon Society (MAS), The Nature Conservancy (TNC), Isaac Walton League (IWLA), National Wildlife Federation (NWF), Defenders of Wildlife, etc.], landowner groups [e.g. Small Woodlot Owners Association of Maine (SWOAM), Maine Forest Products Council (MFPC), etc.], Native American Tribes, and other nongovernmental organizations and interested individuals

are invited to participate. Members of the working groups give freely of their time and expertise, often commuting hundreds of miles and using vacation time or losing wages to participate.

A facilitator, often the department's planner, conducts each meeting; although MDIFW will occasionally hire a facilitator from outside the agency. A number of department fact persons, including the species assessment author, regional staff, and sometimes Warden Service personnel, also attend working group meetings. The working group may ask agency personnel for clarification of the assessment or may be specifically asked by the group to provide other input, however, MDIFW personnel are not to provide unsolicited input or influence.

Once ground rules are established, the assessment author is asked to give an overview of the assessment and answer any questions the group may have regarding the biology and management of the species, or group of species. The working group is then asked to voice concerns they have regarding management of the species or species group. Questions, issues and concerns are recorded on large flip charts and displayed during the course of the meeting, so group members can refer to them as they develop management goals and objectives.

Subsequent to each public working group meeting, and prior to the next meeting, MDIFW distributes a meeting summary and related materials to all working group members and appropriate agency personnel.

When the group can no longer identify any new concerns, they turn to the task of developing species management goals and objectives. MDIFW defines a goal as "a broad, ambitious statement of policy, which may not be achievable, but will serve as a beacon toward which the agency should head." An example of a goal is, "Increase the deer herd." Management objectives are defined as "specific, measurable, and achievable in a reasonable amount of time." An example of a population objective is, "Increase the deer herd in Wildlife Management Districts (WMDs) 1-6 to 10 deer/mi^2 by the year 2006." Management objectives have been established for populations, productivity, habitat, and outreach. The public working group has broad latitude when developing goals and objectives; they only need to stay within reasonable biological sideboards, e.g. minimum viable population and carrying capacity (K). In other words, the species should not be placed in danger of extinction or allowed to increase beyond the habitat's capability to support the population.

After the working group develops goals and objectives, MDIFW evaluates them based on 1) desirability, 2) feasibility, 3) capability of the habitat, and 4) possible consequences. The department also identifies potential problems that may be encountered when trying to reach the proposed goals and objectives, and lists potential strategies to overcome those problems. The working group then reviews MDIFW's evaluation and determines whether to revise the goals and objectives.

Once the working group is satisfied with their recommendation, the proposed goals and objectives are reviewed by MDIFW's administration and subsequently presented to the Commissioner and the Fish and Wildlife Advisory Council for their approval. Once approved, the goals and objectives become the "marching orders" for the agency.

Part 2. Step 1. Management System

Part 1 answers two critical questions in the planning cycle, "Where are we?" and "Where are we going?" Part 2 answers the questions, "How do we get there?" and "How do we know when we have arrived?"

Wildlife management systems are prepared for major species, or groups of species, for which management goals and objectives have been established through the public working group process.[3] Some species receive little or no management attention. Other species, because of their importance as a game species or their status as Endangered, Threatened, or Special Concern, receive considerable attention and management effort. The purpose of documenting management systems is to clearly identify decision processes, including data inputs, rules-of-thumb that drive decisions, and resulting management actions or options that facilitate reaching the established management goals and objectives.

Once management systems are developed and finalized, we initiate management at the landscape level or within any of five species-specific program areas:

1. Surveys and inventories,
2. Research,
3. Population management,
4. Specific habitat conservation, and/or
5. Education and outreach

Part 2. Step 2. Management System Jobs

Each Project within the Wildlife Resource Assessment Section (WRAS) of MDIFW's Wildlife Division has at least one management system job (either federal or state) under which management systems are documented, evaluated, and revised. The basic approach within each management system job is graphically represented in Figure 18. It consists of several parts including:

1. Documenting the current system;
2. Evaluating the current system;
3. Revising the current system;
4. Developing new jobs to implement the revised management system and address research needs; and
5. Monitoring the revised system and modifying as needed.

Each part of the management system is discussed below.

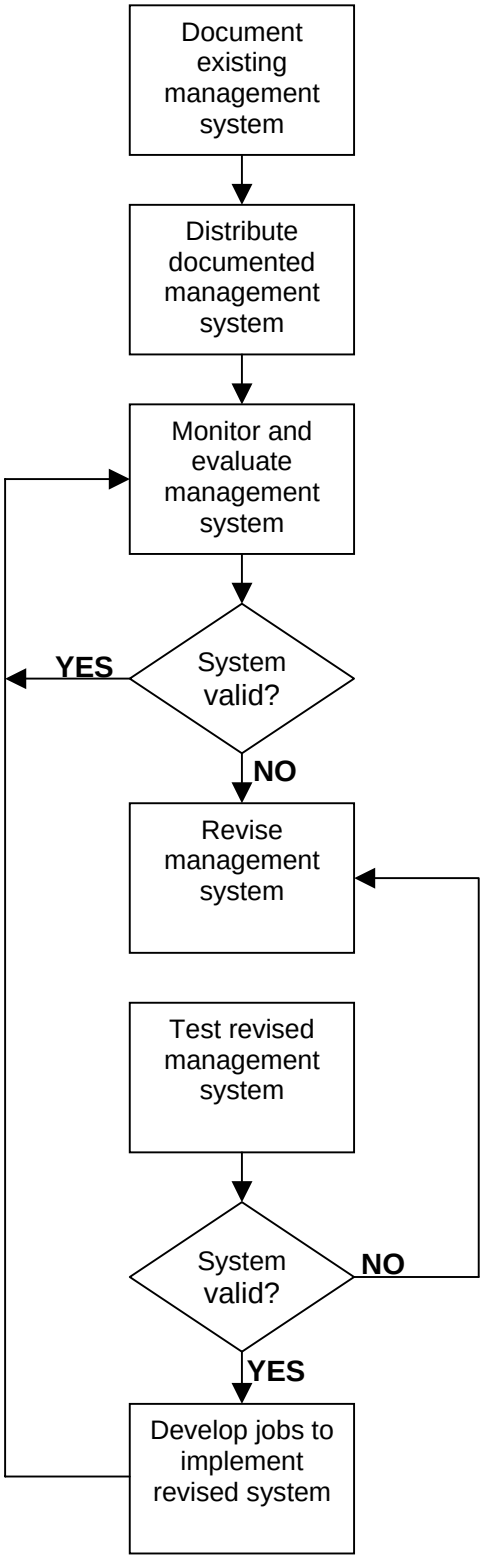
Documenting the Current Management System

Step 1. According to Fraser (1985), the first step in documenting a system is to identify the nature of the product or goal of the management system. Goals and objectives are established through the public working group process. However, they need to be carefully reviewed for clarity so there are no questions as to what the goals and objectives mean.

Step 2. The second step is to identify questions that need to be answered in order to determine whether the goal and objectives are being met. For example, the sample Moose Management System may have a population objective to maintain the moose population at 2004 levels. The first question to be asked is, "Is the current moose population at 2004 levels?" The answer will

[3] There is one statewide inland fisheries management system and several species-specific management plans for inland fisheries in the State (Appendix 11). A comprehensive list of marine fisheries with management plans and an example of a management plan is found in Appendix 10.

Figure 18. Development, Review, and Revision Process for Species Management Systems.



be either "yes" or "no". If the answer is "no", then one may ask, "Is the current moose population below 2004 levels?" This path of reasoning continues until all basic questions are addressed (Figure 19).

Step 3. The third step is to identify criteria and rules-of-thumb that drive the decision process. For example, the first question in the sample Moose Management System asks, "Is the current moose population on target?" In order to address that question, data need to be collected, analyzed, and interpreted, and some rules-of-thumb satisfied before a yes or no decision can be made. To illustrate, suppose the latest moose survey indicates that there are 16,000 moose in the moose hunting area, and assume the 2004 population estimate was 18,500 moose. The rule-of-thumb might state, "If the current estimate is within 20% of the 2004 estimate, then the population is considered on target". If this were the case, then the decision would be that the population is on target. These criteria (data and rules-of-thumb) are clearly identified and documented in the management system.

Step 4. The fourth step is to identify management options or actions. After addressing a series of questions, the final outputs of the decision process are management actions. Again, let's refer to the sample Moose Management System (Figure 19). If, by going through the decision process, we conclude that the current moose population is on target and stable, then the indicated management action would be Management Option I (to maintain current permit allocations, season length, and zone structure). If, however, we conclude that the population is below target and decreasing, the management action would be Management Option III (to decrease permit allocations by some agreed upon formula). These management actions must be specific and clearly stated. It should be noted that management options sometimes include a prioritized list of management actions.

Evaluating the Current Management System

After documentation of the current system is complete, the next step is to evaluate or critique the current system. This is accomplished in several phases.

Phase 1. The first phase is to examine the goal and objective (s) of the management system and address the following questions:

a. Are the goals and objectives realistic, or do they need to be reevaluated?
b. Are the goals and objectives clearly stated?
c. Are all underlying assumptions listed, and are they clearly stated?

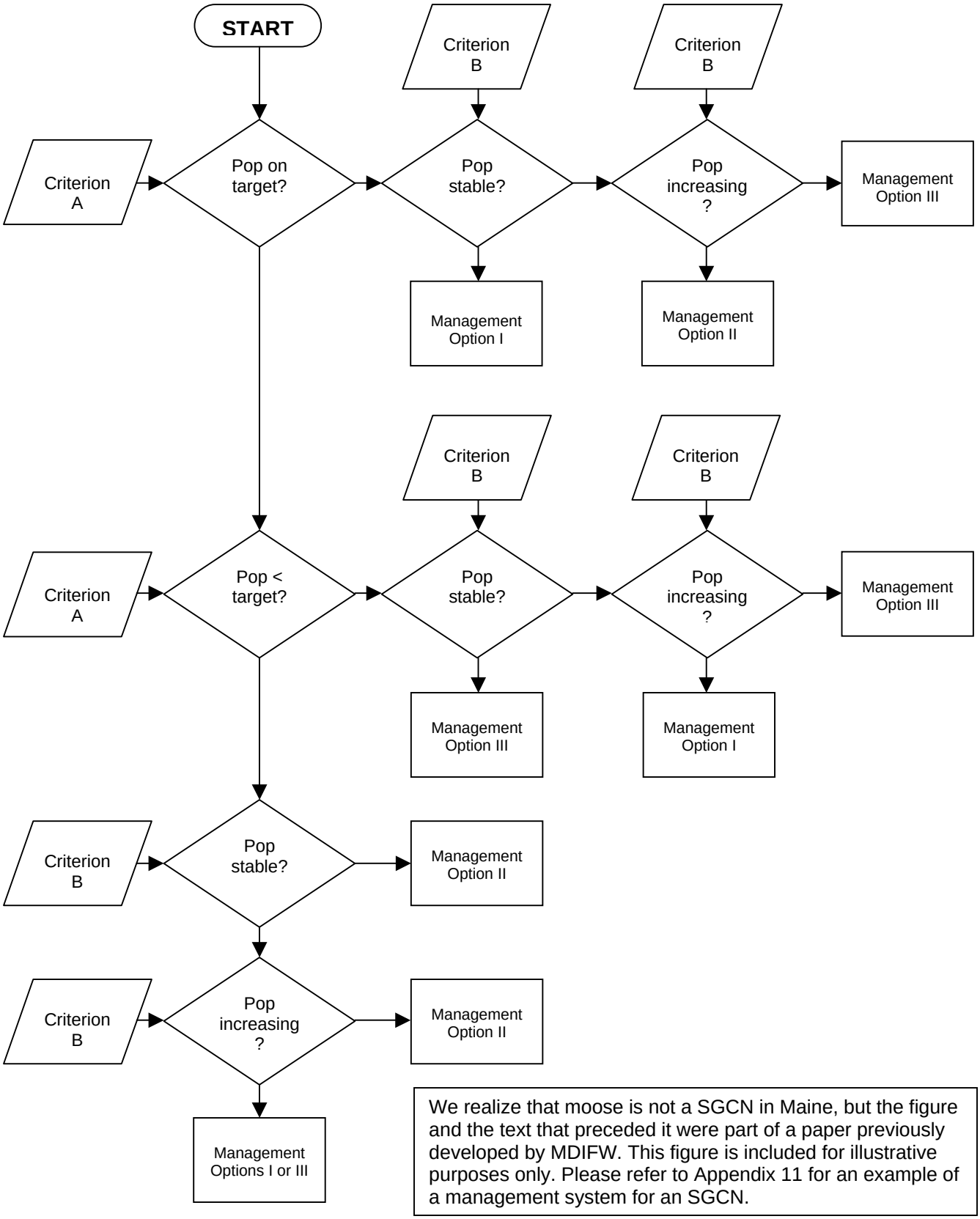
Phase 2. The second phase involves reviewing the flow of decision points. Questions to be answered are:

a. Are all decision points essential?
b. Are there any missing decision points?
c. Are decision points in a logical sequence?
d. Are all decision points clearly stated?

Phase 3. The third phase involves evaluating criteria that drive each decision point. This includes examining data inputs and rules-of-thumb. Questions concerning data inputs include:

a. How are data collected, analyzed, and interpreted?
b. What is the frequency of data collection?

Figure 19. Sample Moose Management Decision-making Process.



We realize that moose is not a SGCN in Maine, but the figure and the text that preceded it were part of a paper previously developed by MDIFW. This figure is included for illustrative purposes only. Please refer to Appendix 11 for an example of a management system for an SGCN.

c. What biases exist in the data?
d. Is the sampling procedure statistically sound?
e. Is the sample size adequate, less than adequate, or more than adequate?
f. Are the statistical models used to analyze data appropriate?
g. Are all data sets and analyses vital to the decision process?
h. Are there better approaches, techniques, models, etc. available to serve as inputs to each decision point?

Questions concerning rules-of-thumb include:

a. Are the rules-of-thumb realistic in view of the quality of data feeding them?
b. Is it the consensus of the Wildlife Division that the rules-of-thumb are acceptable until better data inputs and a revised system are available?

Revising the Current Management System

When a system is evaluated, the outcome is 1 or more recommendations:

a. Accept current system as documented;
b. Revise decision criteria by deleting, modifying, and/or adding data inputs;
c. Revise decision criteria by deleting, modifying, and/or adding rules-of-thumb;
d. Revise decision process by adding, deleting, clarifying, and/or changing the sequence of decision points; and/or
e. Revise management options by-adding, deleting, clarifying, and/or modifying management actions.

Modifying, Eliminating, or Developing Jobs for the Revised Management System

Once a management system has been revised, a need to revise MDIFW's operational plan by modifying or deleting current federal and state jobs, or developing new jobs, may become apparent. Some jobs may no longer be needed to drive the revised management system; those jobs should be eliminated. However, new data collection or research efforts may be required by the revised management system, thus necessitating development of new jobs before the revised system can be implemented.

Monitoring the Revised Management System

No system should be viewed as a final product; it must be subjected to constant review. The review process may identify problems in the system. Staff may be able to solve some problems by making minor adjustments in data collection and analyses. However, major problems with rules-of-thumb or management actions may be encountered. These types of problems require a major revision of the system that must be approved by the Wildlife Division.

The review process might also identify better methodologies as a result of research findings or a literature review. A pilot study can be established to test any new methodologies. If the pilot study proves to be successful, the system is revised to include the new methodology and is then approved by the Wildlife Division.

The goal is to develop the best possible management systems within existing political and resource constraints, which is accomplished through the thoughtful monitoring, review, and revision of each wildlife management system by everyone in the Wildlife Division. Because

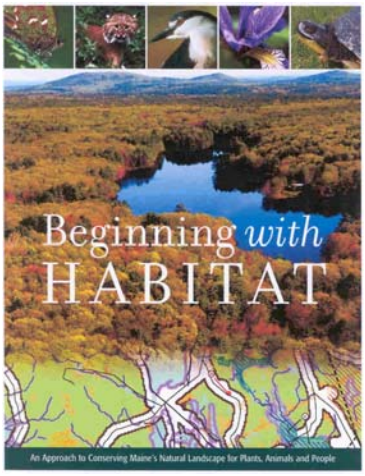
management systems have proven so successful in defining decision criteria and focusing the work program, MDIFW requires that management system be developed soon after goals and objectives are approved and prior to development of more than a skeletal operational plan.

Since 1985, MDIFW has prepared 26 management systems encompassing 247 species, 72 of these are SGCN (Table 41). Copies of all management systems are retained at Departmental field offices and offices in Augusta and Bangor. A representative example of a management system for Grassland Passerines is found in Appendix 11.

Table 41. Status of Wildlife Management Systems.

Species	Number of Species	Number of SGCN	Year Prepared	Revision 1	Revision 2	Revision 3
Birds						
Bald Eagle	1	1	1989			
Common Eider	1	1	2003			
Harlequin Duck	1	1	2004			
Island Nesting Terns	3	3	1993			
Migratory Shorebirds	35	10	2003			
Passerines (Forest)	54	19	2003			
Passerines (Grassland)	7	4	2005			
Passerines (Shrubland)	37	8	2004			
Passerines (Wetland)	9	5	2002			
Piping Plover	1	1	1994			
Ruffed Grouse	1	0	1988			
Waterfowl	35	4	1988			
Wild Turkey	1	0	1998	1988	1993	2002
Woodcock	1	0	1988			
Herpetofauna						
Vernal Pools	4	1	2001			
Invertebrates						
Clayton Copper	1	1	2002			
Tomah Mayfly	1	1	2004			
Inland Fish						
Inland Fisheries	46	12	1991			
Mammals						
Beaver	1	0	1988			
Black Bear	1	0	1988	1990		
Bobcat	1	0	1988	1995		
Fisher	1	0	1988	1990		
Marten	1	0	1988	1990		
Moose	1	0	1989	1989	1990	2002
River Otter	1	0	1988			
White-tailed Deer	1	0	1989	2004		
Totals	**247**	**72**				

6.2.2 *BEGINNING WITH HABITAT*
A LANDSCAPE APPROACH TO HABITAT CONSERVATION IN MAINE



The Problem: Maine's diverse assemblage of wildlife, plants, and natural communities is threatened. Over two-thirds of the state's rare and endangered species are endangered because of habitat loss.

Historically, Maine's development pattern was based on the town center with homes nearby so that it was practical to walk to the town hall, store, and post office. Farms were thinly scattered on rural roads. Forests for hunting and wood gathering, and lakes and streams for fishing, were not far from the town centers. Small areas of the landscape were converted for residential and commercial purposes, and large contiguous areas were left untouched by development. Today, development in Maine is spreading out, sprawling across our landscape, contributing to the loss of habitat and outdoor experiences.

Much is at risk. Maine is a large state by eastern standards -- as large as the remaining New England states combined. It has a wealth of coastal, freshwater, and upland habitats. Approximately 31,800 miles of streams and rivers course through the state. More than 5,600 lakes and ponds dot the landscape. Maine's scenic, rock-bound coast is 4,100 miles long and embraces 4,613 islands between Kittery and Eastport. One-third of the state's area is comprised of freshwater wetlands, including hardwood floodplains, freshwater marshes, and dense assemblages of vernal pools. Maine is the most heavily forested state in the United States, but also contains some of the most significant grassland and agricultural lands in the Northeast. Collectively, these lands provide significant habitat for many of the Northeast's rare and endangered wildlife.

Development sprawl's deliterious effect on habitat also undermines important economic benefits to Maine communities. In 1996, the economic impact of wildlife recreation in Maine totaled over 1.1 billion dollars. Hunting, trapping, fishing, and wildlife watching combined, have dwarfed Maine's other recreation industries. Wildlife recreation has a larger economic impact than all skiing, whitewater rafting, snowmobiling, windjammer cruises, or other recreational attractions, combined. Wildlife-generated revenues even surpass the economic value of Maine's commercial fishing industry.

Maine's private landowners own over 95% of these lands. Corporate forest landowners own nearly half the state; small woodlot owners, farmers, and residential landowners own much of the remainder. Private landowners are integral to the conservation of our wildlife heritage and natural resources and are often committed in principle to stewardship of endangered or threatened species, but the lack of appropriate incentives has limited the scale and tenure of such partnerships.

The Solution: Private Landowner Partnerships Guided by *Beginning with Habitat*

Beginning with Habitat (BwH) embodies a fundamental change in the way that state and federal agencies approach wildlife habitat conservation. It is a habitat-based model that provides the information to cooperatively create a landscape with local decision-makers that will support all

breeding species of wildlife occurring in Maine into the future. Too often, the ability of the landscape to support wildlife is eroded by the impacts of unplanned, sprawling development. *Beginning with Habitat* takes habitat data from multiple sources, integrates it into one package, and makes it accessible to communities to use pro-actively (Appendix 12). *Beginning with Habitat* partners can then work with communities to design a landscape that accommodates the growth they need with the highest resource conservation, by creating a functional landscape based on the resources available and the habitat needs of species that are present. The program is designed to help towns create a vision for their future that includes maintaining the ability of their landscape to support all wildlife 100 years from now.

Beginning with Habitat seeks to achieve habitat conservation for rare and endangered species by working cooperatively with willing public and private landowers; it is not a regulatory, land-use zoning mechanism. The success of *Beginning with Habitat* depends largely on voluntary land conservation efforts by landowners, particularly private landowners. These habitat conservation efforts will involve conservation easements, cooperative management agreements, and other tools. The availability of meaningful incentives is critical to long-term stewardship by the private landowner. If continued development of Maine is done thoughtfully, it will be located in appropriate areas, and open space will be maintained for fish, wildlife, and plant habitat; farming and forestry opportunities; as well as outdoor recreation.

Collaboration: The most important first step to protecting habitat is knowledge. This program brings together the expertise and resources of the Maine Department of Inland Fisheries and Wildlife, the Maine Department of Conservation's Natural Areas Program, the U.S. Fish and Wildlife Service, The Nature Conservancy, the Maine State Planning Office, Maine Audubon Society, Maine Coast Heritage Trust, and Maine's 13 Regional Planning Commissions.

Beginning with Habitat provides municipalities, land trusts, and other organizations engaged in habitat conservation for rare and endangered species with the ecological knowledge required to work effectively with private landowners to achieve optimal, focused habitat conservation.

It does this by providing each Maine town with a series of integrated maps and accompanying information depicting and describing various habitats of statewide and federal significance, including rare and endangered species, found in the town. These maps provide information to communities that can help guide conservation of valuable habitats as well as recommendations that can be used to build a system of interconnected and conserved lands. The partnership also provides coordinated technical assistance. It is hoped that the data, maps, written material, and suggestions for local conservation strategies will help inform and guide each town's growth in such a way that 50 years from now Maine will retain its rich and diverse outdoor heritage. Unprecedented levels of cooperation among the coalition members make these innovations possible.

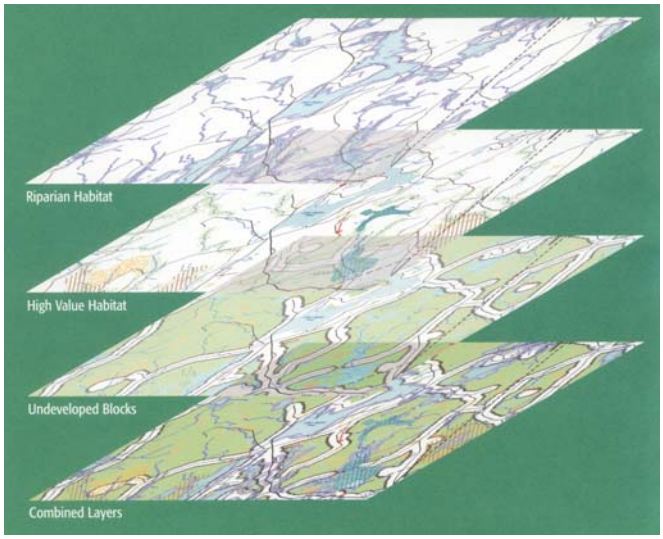
The Maine Department of Inland Fisheries and Wildlife and the Maine Natural Areas Program also provide *Beginning with Habitat* data to various land conservation partners: local/regional land trusts, Maine Coast Heritage Trust, The Nature Conservancy, and the Maine Audubon Society.

The Beginning with Habitat Model: The University of Maine's Cooperative Fish and Wildlife Research Unit (CFWRU) initially developed *Beginning with Habitat* under the direction of the Department of Inland Fisheries and Wildlife (Krohn and Hepinstall 2000). Data on plants and wildlife habitats of federal interest were later added by the Maine Natural Areas Program and the U.S. Fish and Wildlife Service.

By overlaying maps of the habitat needs of all of Maine's vertebrate species with Maine's primary land cover types (forests, fields, wetlands) in a geographic information system (GIS), the CFWRU was able to determine that 80-95% of all of Maine's vertebrate species would likely be present if riparian habitats, high value plant and animal habitats, and large habitat blocks are protected.

The *Beginning with Habitat* program provides municipalities, land trusts, and other organizations engaged in habitat conservation with maps of habitat data and conservation recommendations in three primary areas that are used to build a system of interconnected and conserved lands to promote habitat conservation for Maine's diverse assemblage of wildlife and plants, including rare and endangered species.

Riparian Habitat provides habitat for many species that use the transition zone between aquatic and terrestrial habitats. It includes all areas adjacent to streams, rivers, wetlands, lakes and ponds, and can function also as travel corridors linking areas together on the landscape.



High Value Plant and Animal Habitats include mapped locations of:

1. "High value" habitat for priority trust species as identified and mapped by the Gulf of Maine Project, U.S. Fish and Wildlife Service;

2. Rare plant locations and rare or exemplary natural communities as identified and mapped by the Maine Natural Areas Program; and

3. Essential habitat defined by Maine's Endangered Species Act (designated for some Endangered species, such as Bald Eagles, Piping Plovers, and Least Terns); significant wildlife habitat defined by Maine's Natural Resources Protection Act (deer wintering areas; waterfowl and wading bird habitats; seabird nesting islands; and shorebird nesting, feeding and staging areas); and the locations of Endangered, Threatened, Special Concern, and other rare species as identified and mapped by MDIFW.

Large Habitat Blocks provide habitat for plants and animals not included in riparian or high value habitats. Large blocks are relatively unbroken areas of habitat including forest, grasslands, and agricultural lands that are crossed by few roads and have relatively little development and human habitation. These areas of relatively intact habitat provide homes for medium to large bodied animals with large spatial requirements and, in the case of large forested blocks, for species requiring forest interior habitat. Management of some of these uplands in early successional stages is critical to conservation of listed species such as grasshopper sparrows, upland sandpipers, northern blazing star, etc. and candidate listings like New England cottontails. Conservation of Large Habitat Blocks also presents opportunities to promote and preserve active farmland and woodlots, provide recreational opportunities, conserve aquifers, and maintain scenic vistas.

Maps featuring water resources and riparian habitats, high value plant and animal habitats including federal trust species, and large undeveloped habitat blocks comprise the core *Beginning with Habitat* maps. Municipalities are also provided with supplemental maps showing public and conservation lands, watersheds, species-at-risk focus areas, etc.

Accomplishments: Since its inception in 2000, the *Beginning with Habitat* project has met with and provided information to nearly 150 cities and towns in Maine and more than 30 land trusts and regional planning commissions. Many towns have incorporated the information they have received from BwH into their comprehensive plans. Improved scientific understanding by local planners is reflected in better planning for habitat conservation and land use decisions. By educating local decision-makers about the link between wildlife habitat and other resource functions such as water and air quality, flood flow control, and aesthetics and recreational opportunities provided by open space, communities are better prepared to plan. In 2003, an interactive website was developed www.beginningwithhabitat.org to provide quick, efficient access to all of the BwH information.

The Challenges to Accomplishing *Beginning with Habitat*: Habitat conservation for Maine's rare, Threatened, and Endangered wildlife, plants, and natural communities is largely provided by the voluntary stewardship of the private landowner, who rarely is compensated for protecting his or her land as habitat for these rare species.

For the last 5 years, BwH partners have worked together on the overall design of *Beginning With Habitat*. MDIFW's companion program, *Living With Endangered Species*, provides outreach and education for landowners and suggests strategies for local stewardship of Bald Eagle and Piping Plover habitat. Both of these initiatives rely on a landowner incentive program, but until recently federal and state funds have been limited. Limited funding to staff, establish, and implement a landowner incentive program has limited habitat conservation successes on private lands.

In 2004, Maine received a $1.3 million federal grant to implement a Landowner Incentive Program (LIP) in the state, and was awarded an additional $655,000 in LIP funds in 2005. MDIFW is using new federal assistance available through the Landowner Incentive Program to develop capacity within Maine to:

- Support implementation of Maine's ongoing broad-scale habitat conservation planning effort, *Beginning with Habitat*, by working cooperatively with willing private landowners via incentives and cooperative agreements;

- Conserve habitats on private land to benefit State-listed, Federally-listed, proposed, candidate species, and other species at risk; and

- Provide technical and financial assistance to landowners for habitat protection and restoration.

Replication: *Beginning with Habitat* is a model for the way government agencies can cooperate with non-profit conservation organizations and local communities across the country. In Maine, the program has already provided a model for the dissemination of other types of data to local planners. As demonstrated by its replication in Maine, many aspects of this program are transferable beyond the conservation and planning fields. For example, harnessing the power of private non-profit organizations to assist with government efforts is an effective use of both government and non-profit resources. Similarly, when local decision-makers have quality

information, training, and technical assistance they are better able to support state conservation goals and leverage state and federal resources while ensuring that solutions are relevant and effective at a local level.

Recognition: The New England Office of the U.S. Environmental Protection Agency recognized *Beginning with Habitat* with an Environmental Merit Award at a special Earth Day ceremony held at Faneuil Hall in Boston on April 22, 2004. The EPA's Environmental Merit Award is an annual award that recognizes outstanding environmental advocates who have made significant contributions toward preserving and protecting our natural resources.

Beginning with Habitat's nexus with Maine's CWCS Key Habitats

Maine's SGCN have requirements that are inextricably tied to their habitats, and degradation or loss of habitat is often a primary threat to species viability. To conserve SGCN, we have identified 21 key habitats, described in Chapter 4.2 and used throughout this CWCS. Their nexus with the 3 primary layers of *Beginning with Habitat* is depicted in Table 42. Though individually these habitat types are important to Maine's SGCN, they are functionally more effective if connected. *Beginning with Habitat's* riparian and large habitat block layers allows us to build a system of interconnected and conserved lands.

Table 42. Nexus of Beginning with Habitat layers with Maine's CWCS key habitats.

High Value Plant and Animal Habitats	Riparian Habitat	Large Habitat Blocks
Dry woodlands and Barrens (<60% canopy cover)	Marine Open Water	Coniferous Forest
Mountaintop Forest (including krummholz)	Estuaries and Bays	Deciduous and Mixed Forest
Alpine (summits and tablelands above treeline)	Rocky Coastline and Islands	Grassland / Agricultural / Old Field (shrubs <50%)
Cliff face and Rocky Outcrop (including talus)	Unconsolidated Shore (beaches and mudflats)	Shrub / Early Successional (including regenerating forests)
Caves and Mines	Estuarine Emergent Saltmarsh	
	Freshwater Lakes and Ponds	
	Emergent Marsh and Wet Meadows	
	Forested Wetland	
	Shrub-scrub Wetland	
	Peatlands	
	Rivers and streams	

Adapting *Beginning with Habitat* for Use in Towns in Northern and Eastern Maine

The *Beginning with Habitat* program is a cooperative, non-regulatory habitat conservation approach to working with municipalities, land trusts, and other conservation organizations to conserve riparian habitats, high value plant and animal habitats, and large blocks of upland habitat. Its goal is to create and maintain a landscape to support all native plant and animal species currently breeding in Maine .

Since its inception, *Beginning with Habitat* has been used to promote habitat conservation in Maine's 435 organized towns where more than two-thirds of the state's rare and endangered species occur and the pace and pervasiveness of development is a constant threat. *Beginning with Habitat's* mission in the managed forests within 457 unorganized townships in northern, western, and eastern Maine is no different than that of southern, central, and coastal areas. The only differences are land ownership patterns and land use practices.

During the past 10 years, a number of large forest landowners have initiated their own efforts to conserve habitat at the landscape scale, particularly in regards to riparian habitat and more recently incorporating the marten habitat model developed at the University of Maine (Hepinstall and Harrison 2004). While regulation of habitats (e.g., deer wintering areas) has been in place for more than 30 years, this approach, and other single-species habitat conservation efforts, are not meeting the need to address habitats and natural communities as part of forest management at the landscape scale.

In 2003, MDIFW convened a working group of state and federal agencies, nongovernmental organizations, and academia to develop recommendations for adapting *Beginning with Habitat* to conserve habitat for at-risk species in the managed forests within the unorganized townships in Maine. The working group identified the following goals and desired outcomes. A number of strategies and supporting documentation is found in Appendix 12. Success will depend on voluntary actions and cooperative efforts by landowners and land managers.

Goals

- Maintain sufficient habitat to support all native plant and animal species currently breeding in Maine.
- Maintain healthy, well-distributed populations of native flora and fauna.
- Maintain a complete and balanced array of ecosystems.

Desired Outcomes

- Maintain and increase number of large blocks of forest.
- Conserve high value plant and animal habitats.
- Protect natural communities.
- Provide adequate early successional habitat for wildlife species.
- Conserve riparian areas/wetlands.
- Increase amount and distribution of late successional habitats.
- Minimize impact of roads.

6.3 PRINCIPLES FOR PRIORITIZING CONSERVATION EFFORTS

This CWCS addresses species in greatest need of conservation for which no dedicated, stable, flexible, or responsive conservation program exists. There is a wealth of information on priority species and their needs identified herein and in accompanying appendices. The value of this CWCS extends far beyond the requirements and funding of the State Wildlife Grant program and beyond the missions of MDIFW, MDMR, and MASC. Indeed, this is an historic opportunity and challenge for these agencies and their conservation partners to provide effective and visionary leadership in conservation of all wildlife occurring in Maine. To be effective, we must build a program that is stable, opportunistic, flexible, transparent, inclusive, and one that capitalizes on partnerships.

A program must also address the greatest number of the most critical conservation needs, and be flexible enough to adapt to changing needs and be able to respond to opportunities for collaboration among partners. Since current available funding is insufficient relative to the conservation need, we must prioritize conservation actions in order to stretch limited funds to yield the highest conservation return. We chose not to prioritize the hundreds of conservations actions described in Tables 30-35 (Chapter 5) but instead developed a process to prioritize actions that was dynamic and responsive.

Table 38, presented earlier in this chapter, identifies SGCN by habitat type and identifies the two highest priority conservation actions among the five in our CWCS (Surveys and Monitoring, Research, Population Management, Habitat Conservation, and Education and Outreach). This table allows us to evaluate relationships between habitats, species, and conservation actions. The conservation priorities in Table 38 will change as new information becomes available or a SGCN status changes. In the future, we will develop a relational database that will allow more flexibility to investigate conservation opportunities. In the interim, Table 38, in conjunction with the guiding principles below, will be used to develop and implement Maine's conservation program.

The following five guiding principles (not presented in order of priority) describe how Maine will develop a sustainable program by the way that funds are allocated to priority species and their conservation needs:

1. Look for opportunities to address the information-gathering and conservation needs of as many species as possible with common approaches and actions (e.g. ecoregional surveys and *Beginning with Habitat*).

2. Provide some funding to address critical population management issues (e.g. heightened law enforcement to protect species vulnerable from take).

3. Provide some funding to address surveys/research to answer critical conservation guidance/policy questions (e.g. lynx in relation to listing petition).

4. Maintain enough steady funding to programs and approaches likely to benefit the most species and address the most important threats over time - especially the systematic ecoregional surveys and landscape habitat conservation programs that maintain habitat for all known species associations. Maine's *Beginning with Habitat* landscape conservation program is our single most important longterm conservation action, and

requires stable funding to maintain constant positive movement to affect the broad social issues necessary to effectively conserve landscapes into the future for all wildlife.

5. Maintain enough flexibility to use funds to respond to opportunities in all five program components to leverage and enhance other funds and partnership opportunities.

Integral to the development of a stable and responsive conservation program are expenditures for program administration and dedicated personnel. Program development and implementation will be reviewed at least annually by a CWCS Implementation Team (Chapter 8.2) in order to refine and coordinate conservation actions among conservation partners in Maine.

For more information describing how Maine has allocated its SWG funds to date, please refer to Appendix 1.